



NOAA Fleet Update

February 2016

The following update provides the status of NOAA's fleet of ships and aircraft, which play a critical role in the collection of oceanographic, atmospheric, hydrographic, and fisheries data. NOAA's current fleet of 16 ships – the largest civilian research and survey fleet in the world – and nine aircraft, are operated, managed, and maintained by NOAA's Office of Marine and Aviation Operations ([OMAO](#)). OMAO includes civilians, mariners, and officers of the United States NOAA Commissioned Officer Corps ([NOAA Corps](#)), one of the nation's seven Uniformed Services.



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Office of Marine and Aviation Operations (OMAO) and the NOAA Commissioned Officer Corps

– *In the News* –

[NOAA Advances Hurricane Research Technology with Improved Coyote UAS](#)

-NOAA Atlantic Oceanographic and Meteorological Laboratory

A team from NOAA and Raytheon successfully demonstrated recent advancements of the Coyote Unmanned Aircraft System (UAS) while completing a mid-flight launch from the NOAA P-3 Hurricane Hunter aircraft on January 7th. The successful flight verified new technology designed to improve Coyote's ability to collect vital weather data to improve hurricane forecasts. The Coyote was released from NOAA's Hurricane Hunter P-3 aircraft to fly over the Avon Park Air Force Range in Avon Park, Florida in order to measure the transmission range of upgraded technologies. The unmanned aircraft set a new distance record for flight control and data transmission to the P-3, and provided NOAA hurricane forecasters with real-time data on atmospheric air pressure, temperature, moisture, wind speed and direction as well as surface temperature. The Coyote collects all of this essential data at altitudes too low for manned aircraft to safely navigate in the hurricane environment...

[Science, Service, and Adventure with CDR G. Mark Miller](#)

-Waterfront Alliance

Commander G. Mark Miller is the commanding officer of the National Oceanic and Atmospheric Administration (NOAA) Ship *Henry B. Bigelow*. A research vessel, the Bigelow surveys the waters between Nova Scotia and Cape Hatteras. CDR Miller lives in Newport, Rhode Island, with his wife and child, but, since the Bigelow is undergoing general maintenance at GMD Shipyard, at the Brooklyn Navy Yard, he's spending a couple months in New York. The Bigelow happens to be in GMD's Dry Dock 1, which launched the Union's first iron-clad warship USS Monitor in 1862 and is among the oldest dry docks still working on the east coast. We spoke with CDR Miller recently about his experiences and NOAA's regional impacts...

[Studying the Heart of El Niño, Where Its Weather Begins](#)

-New York Times

HONOLULU — A thousand miles south of Hawaii, the air at 45,000 feet above the equatorial Pacific was a shimmering gumbo of thick storm clouds and icy cirrus haze, all cooked up by the overheated waters below. In a **Gulfstream jet** more accustomed to hunting hurricanes in the Atlantic, researchers with the National Oceanic and Atmospheric Administration were cruising this desolate stretch of tropical ocean where the northern and southern trade winds meet. It's an area that becalmed sailors have long called the doldrums, but this year it is anything but quiet. This is the heart of the strongest El Niño in a generation, one that is pumping moisture and energy into the atmosphere and, as a result, roiling weather worldwide...

Monster El Niño probed by meteorologists; Unprecedented Pacific Ocean campaign aims to improve forecasts for strong storms

-Nature

Climate scientists this week began a research blitz to study El Niño, the climate trouble-maker that disrupts weather around much of the globe. For the next two months, US researchers will use specially outfitted planes, a research ship and hundreds of weather balloons to monitor the region in the tropical Pacific Ocean where El Niño forms. Ultimately, the scientists say, their measurements could help to improve weather forecasts and unlock secrets about how powerful El Niño events evolve...To begin the campaign, NOAA sent its Gulfstream-IV research jet to Hawaii, its base for about 20 flights south towards the Equator. Using onboard remote-sensing equipment and dropsondes — packages of instruments released from the plane — the team will measure winds, temperature, air pressure and moisture from a height of 12–14 kilometers down to the ocean surface...In February, NASA's unmanned Global Hawk aircraft will join the effort, prowling the eastern part of the Pacific in 4 flights lasting up to 24 hours each. At the same time, NOAA will launch instrument packages on weather balloons from Kiribati, or Christmas Island, an atoll near the Equator in the heart of the region in which El Niño forms. And researchers will also release balloon-borne instruments from the NOAA Ship *Ronald H. Brown* as it conducts a previously planned cruise in the central Pacific...

NOAA Gins Up Major El Niño Field Campaign: Hurricane Pali Spins Southwest of Hawaii

-Weather Underground

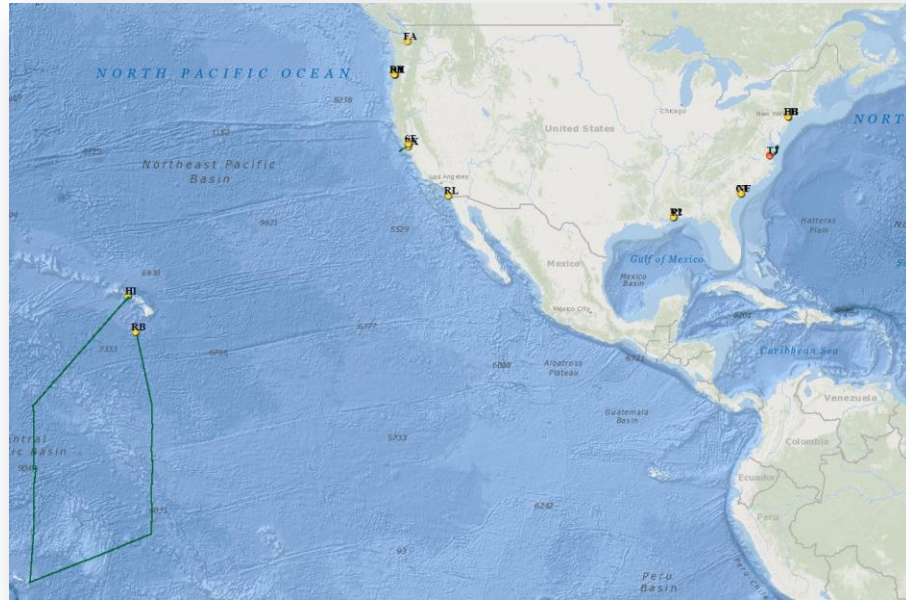
Scientists at NOAA will be putting the well-predicted “super” El Niño of 2015-16 under a mammoth microscope over the next three months. With just enough time to line up some big observing platforms--plus a lot of other things going right--NOAA/ESRL's Physical Sciences Division (PSD) has managed to pull together a major field effort that will analyze the mechanics of this El Niño in truly unprecedented detail...The first platform for the project is NOAA's Gulfstream-IV hurricane-hunter aircraft. The high-flying Gulfstream-IV is typically used to monitor the atmosphere around hurricanes, so it's an ideal tool for sampling how the El Niño convection is affecting the surrounding air at high altitudes...Another platform—the NOAA Ship *Ronald H. Brown* research vessel is part of the project thanks to another happy coincidence. The Ron Brown was already scheduled to be plying the eastern tropical Pacific from mid-February to mid-March to carry out maintenance on the dozens of buoys that monitor the atmosphere and ocean across the region (among other things, helping to detect El Niño itself)...



OMAO's Ships and Centers



OMAO's [Ship Tracker](#) (screen shot below) shows information about the location - present and past - of our fleet of research and survey ships. Please note: To access Ship Tracker you must create an account with a **.gov** or **.mil** email address. All other access is restricted.



OMAO's ships and related Marine Centers are listed below based on the geographical location of the vessels' homeports starting in the Northeast and ending in the Pacific.

New Castle, NH

NOAA Ship *Ferdinand R. Hassler*

Commanding Officer:

LCDR Briana Welton

Primary Mission Category:

Hydrographic Surveys

DEPART: Norfolk, Virginia

ARRIVE: Norfolk, Virginia

Project: Approaches Chesapeake Bay

Objectives: To support safe navigation through the acquisition and processing of hydrographic survey data for updating nautical charts and by the identification and dissemination of dangers to navigation, as identified during the course of survey operations.



NOAA Ship *Ferdinand Hassler* docked, with United States Coast Guard Barque *Eagle* in the background.

[Photo: Cheryl Oliver, NOAA]

Woods Hole, MA (currently docks in Newport, RI)

NOAA Ship *Henry B. Bigelow*

Commanding Officer: CDR G. Mark Miller

Primary Mission Category: Fisheries Research

Ship Status: In drydock at GMD Shipyard Corp., Brooklyn, NY, for a scheduled repair period. After repairs, sea trials will be conducted to measure the vessel's performance and general seaworthiness, as well as for the calibration of all ship systems.

Davisville, RI

NOAA Ship *Okeanos Explorer*

Commanding Officer: CDR Mark Wetzler

Primary Mission Category: Oceanographic Exploration and Research

Depart: Alameda, Calif. **Arrive:** Honolulu, Hawaii

Depart: Honolulu, Hawaii **Arrive:** Kwajalein, Republic of the Marshall Islands

Project 1: Transit from Shipyard Alameda, Calif. to Honolulu, Hawaii conducting mission tests and calibrating new mission sonars, equipment, data management infrastructure, and telepresence capabilities, ensuring readiness for the field season.

Project 2: CAPSTONE

Objectives: CAPSTONE is a three year initiative to collect critical baseline NOAA science and management needs in largely unknown areas of U.S. waters in the Pacific. Operations conducted during this campaign support NOAA missions to understand and predict changes in climate, weather, oceans and coasts, and share that knowledge and information with others. Much of this work associated with CAPSTONE will contribute to and complement Deep Sea Coral Research and Technology Program's three-year Pacific Islands Regional Initiative.

Norfolk, VA

NOAA Ship *Thomas Jefferson*

Commanding Officer: CAPT Shepard Smith

Primary Mission Category: Hydrographic Surveys

Ship Status: Alongside NOAA Marine Operations Center - Atlantic, Norfolk, VA, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

OMAO'S MARINE OPERATIONS CENTER – ATLANTIC (MOC-A)

CAPT Anne Lynch, Commanding Officer MOC-A

MOC-A serves as a homeport for one NOAA ship, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA's Atlantic fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

Charleston, SC

NOAA Ship *Nancy Foster*

Commanding Officer: LCDR Jeffrey Shoup

Primary Mission Category: Oceanographic Research, Environmental Assessment

Ship Status: Alongside Charleston, SC, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.



The NOAA Ships *Gordon Gunter* and *Nancy Foster* at Detyens Shipyard in North Charleston, S.C.

[Photo: ENS Keith Hanson, NOAA]

NOAA Ship *Ronald H. Brown*

Commanding Officer:

CAPT Robert Kamphaus

Primary Mission Category:

Oceanographic Research, Environmental Assessment

DEPART: Honolulu, Hawaii

ARRIVE: Honolulu, Hawaii

DEPART: Honolulu, Hawaii

ARRIVE: San Diego, California

Project 1: Palmyra Mapping

Objectives: Extended Continental Shelf (ECS) mapping surveys are a key component in developing a U.S. ECS claim, pursuant to Article 76 of the United Nations Convention on the Law of the Sea (UNCLOS). In addition to considerable scientific analysis, these surveys will require bathymetry to take place in depths of 1000-5000m. Broadly, the ECS Project mission is to define and establish limits of the U.S. ECS in concrete geographic terms to provide the specificity and certainty necessary to protect and use these resources.

Project 2: TAO Maintenance (125°W and 140°W)

Objectives: Maintenance of the TAO moored ocean buoy array along the 125°W and 140°W meridians. The TAO buoy array is critical to providing real-time data for improved detection, understanding and prediction of El Nino and La Nina events.

Pascagoula, MS

NOAA Ship *Oregon II*

Commanding Officer:

Master Dave Nelson

Primary Mission Category:

Fisheries Research

Ship Status: Alongside Pascagoula, MS, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

NOAA Ship *Pisces*

Commanding Officer:

CAPT Michael Hopkins

Primary Mission Category:

Fisheries Research

Ship Status: Alongside Pascagoula, MS, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.



The NOAA Ships *Pisces* off the coast of Puerto Rico during a Caribbean Reef Fish Survey.

[Photo Ron Ditmore]

NOAA Ship *Gordon Gunter*

Commanding Officer: Master Donn Pratt

Primary Mission Category: Fisheries Research

Ship Status: In drydock at Detyens Shipyards Inc. in Charleston, SC, for a scheduled repair period. After repairs, sea trials will be conducted to measure the vessel's performance and general seaworthiness, as well as for the calibration of all ship systems.

San Diego, CA

NOAA Ship *Reuben Lasker*

Commanding Officer: CDR John Crofts

Primary Mission Category: Fisheries Research

Ship Status: Alongside San Diego, CA, for scheduled maintenance, repairs, scientific data processing, crew rest, and training.

Newport, OR

NOAA Ship *Rainier*

Commanding Officer: CDR E.J. Van Den Ameele

Primary Mission Category: Hydrographic Surveys

Ship Status: Alongside Newport, OR, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training and will be transiting to drydock in San Francisco, CA.

NOAA Ship *Bell M. Shimada*

Commanding Officer: CDR Paul Kunicki

Primary Mission Category: Fisheries Research

DEPART: San Francisco, California **ARRIVE:** Newport, Oregon

DEPART: Newport, Oregon **ARRIVE:** Newport, Oregon

DEPART: Newport, Oregon **ARRIVE:** Newport, Oregon

Project 1: Pacific Hake Spawning Biomass

Objectives: To estimate the biomass, distribution, and biological composition of Pacific hake populations using data from an integrated acoustic and trawl survey off the west coast of the U.S. and Canada.

Project 2: Northern California Current Ecosystem Survey

Objectives: Make hydrographic measurements such as conductivity, temperature, and depth (CTD), collect water samples for chemical analyses with a Niskin bottle rosette, and collect zooplankton samples with towed plankton nets at an array of stations along transect lines extending across the Oregon, Washington, and northern California coast.

Project 3: Southern Resident Killer Whale Critical Habitat Assessment

Objectives: Conduct acoustic and visual surveys of marine mammals and seabirds along the Oregon, Washington, California, and Canadian coasts in order to determine Critical Habitat in the coastal portion of the range of Southern Resident killer whales. The collection of predation, fecal, and biopsy samples will be of significant additional value. Secondary objectives include locating and documenting other cetacean species, in particular the collection of photographs and audio recordings of other killer whale pods, as well as sea bird counts and oceanographic data.

OMAO'S MARINE OPERATIONS

CAPT Todd Bridgeman, Director of Marine Operations

OMAO's Marine Operations over-sees operations of the three regional Centers, including the Marine Operations Center-Pacific, Marine Operations Center-Atlantic, and Marine Operations Center-Pacific Islands.

OMAO'S MARINE OPERATIONS CENTER – PACIFIC (MOC-P)

CDR Brian Parker, Commanding Officer MOC-P

MOC-P serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the research and survey ships in NOAA's Pacific fleet. Each year these ships conduct dozens of missions to assess fish and marine mammal stocks, conduct coral reef research, collect seafloor data to update nautical charts, and explore the ocean.

Ketchikan, AK

NOAA Ship *Fairweather*

Commanding Officer:

CDR David Zezula

Primary Mission Category:

Hydrographic Surveys

Ship Status: Alongside Seattle, WA, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.



The NOAA Ship *Fairweather* underway in Dutch Harbor, Alaska.

[Photo: NOAA]

Kodiak, AK

NOAA Ship *Oscar Dyson*

Commanding Officer:

CDR Arthur “Jesse” Stark

Primary Mission Category:

Fisheries Research

Depart: Newport, Ore.

Arrive: Kodiak, Alaska

Depart: Kodiak, Alaska

Arrive: Kodiak, Alaska

Project 1: CO₂ Surface and FOCI Mooring recovery/deployment

Objective: NOAA will recover two surface instrumentation buoys to; characterize ocean acidification conditions on the U. S. in S.E. Alaska and northern Gulf of Alaska, conduct inter-calibration measurements near the OA observing assets in the study area, allowing inter-calibration of these autonomous assets with high quality, ship-based measurements.

Project 2: Acoustic-trawl survey of Shumagin Islands, Sanak trough, Pavlof Bay and Morzhovoi Bay.

Objective: Collect acoustic-trawl data necessary to determine the distribution, biomass, and biological composition of walleye Pollock; collect target strength data using hull-mounted transducers for use in scaling acoustic data to estimates of absolute abundance; collect physical oceanographic data (temperature and salinity profiles) at selected sites, and continuously collect sea surface temperature and salinity data; and conduct trawl hauls to ground truth multi-frequency echo integration data collection.

Honolulu, HI

NOAA Ship *Hi'ialakai*

Commanding Officer:

CDR Daniel Simon

Primary Mission Category:

Oceanographic Research, Environmental Assessment

Ship Status: Alongside Honolulu, HI, for scheduled maintenance, winter repairs, scientific data processing, crew rest, and training.

NOAA Ship *Oscar Elton Sette*

Commanding Officer:

LCDR Keith Golden

Primary Mission Category:

Fisheries Research

DEPART: San Francisco, California

ARRIVE: Honolulu, Hawaii

DEPART: Honolulu, Hawaii

ARRIVE: Pago Pago, American Samoa

Project 1: Transit from Mare Island Shipyard in San Francisco to Honolulu and sea trials will be conducted to measure the vessel's performance and general seaworthiness, as well as for the calibration of all ship systems.

Project 2: Samoan Archipelago Fisheries Life History

Objectives: Support deep-slope and shallow-water bottom fish, coastal pelagic fishes, and coral reef fishes bio sampling, collection of larval and juvenile stage pelagic and bottom fish species, surveys of coral reef ecosystems, and exploration of seamount benthic species, through 1) collection of adult deep-slope bottom fish, coral reef fish, and coastal pelagic fishes, 2) collection of pelagic stage (larvae and juveniles) eteline snappers and tuna, 3) daylight coral reefs snorkel surveys, 4) collection of oceanographic data from routine conductivity, temperature, depth casts, continuous acoustic doppler current profiler, and thermosalinograph measurements and, 5) collection of fishes and invertebrates at offshore seamounts using strings of Fathoms Plus traps.

OMAO'S MARINE OPERATIONS CENTER – PACIFIC ISLANDS (MOC-PI)

CDR Matthew Wingate, Commanding Officer MOC-PI

MOC-PI serves as a homeport for two NOAA ships, and manages the day-to-day operations and provides administrative, engineering, maintenance, and logistical support for the ships in NOAA's Pacific Islands' fleet.



OMAO's Aircraft



Tampa, Florida

WP-3D (N42RF) – “Hurricane Hunter”

Aircraft Commander: N/A
Temporary Base: Naval Air Station Jacksonville, FL
Current Mission: Scheduled Maintenance - Until May 2016

The aircraft is at the Naval Air Station Jacksonville, Florida undergoing an extensive refurbishment period which will include replacing the wings and upgrading various components. This effort will extend the useful life of the aircraft for another 15-20 years.

WP-3D (N43RF) – “Hurricane Hunter”

Aircraft Commander: CDR Price, LCDR Kerns
Temporary Base: NE Canada
Current Mission: Ocean Winds-Winter

Advanced microwave sensors flown aboard the NOAA P-3 aircraft will improve the use of ocean surface wind data gathered by satellites. This will allow for improvements in active and passive wind measurements and reduce the design and development risk of future observing systems. NOAA will use the information gathered to provide better surface wind data over the global oceans. This mission will also provide advanced measurements to support and calibrate satellites from multiple international organizations.

Gulfstream IV (N49RF)

Aircraft Commander: LCDR Mansour, LT Moyers
Temporary Base: Central Pacific Ocean
Current Mission: El Niño Southern Oscillation (ENSO)

The ongoing El Niño in the tropical Pacific is the second strongest on record for this time of year and is a unique opportunity to coordinate NOAA's scientific and research capabilities to anticipate and respond to an emerging climate extreme and its related impacts. In conjunction with the NASA Global Hawk UAS and the NOAA Ship *Ronald H. Brown*, NOAA's G-IV aircraft will provide an observational foundation to better understand and predict how tropical conditions related to El Niño contribute to the development and evolution of winter storms affecting the eastern north Pacific and western US, particularly the risk for intense storms and heavy rainfall affecting California this winter.

Jet Prop Commander (N45RF)

Aircraft Commander: LT Salling/ LTJG Hirsch
Temporary Base: Various locations
Current Mission: Soil Moisture Surveys

NOAA aircraft use specialized detection equipment to make accurate, real-time measurements of snowpack characteristics and soil moisture across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation's economy. A single snowmelt flood can cause billions of dollars in damage and in the western areas of the country spring snowmelt provides over 70% of the annual water supply. The benefits of accurate snow and soil moisture measurements are immense and NOAA aircraft are uniquely capable to provide this information.

Twin Otter (N46RF)

Aircraft Commander: LT Evory/LT Norman
Temporary Base: Various locations
Current Mission: Soil Moisture Surveys

NOAA aircraft use specialized detection equipment to make accurate, real-time measurements of snowpack characteristics and soil moisture across the country. This information is critical for managers and others to make optimal decisions supporting river, flood, and water supply forecasting, agriculture and forest management, recreation and winter tourism, and the commerce, industry, and transportation sectors of the Nation's economy. A single snowmelt flood can cause billions of dollars in damage and in the western areas of the country spring snowmelt provides over 70% of the annual water supply. The benefits of accurate snow and soil moisture measurements are immense and NOAA aircraft are uniquely capable to provide this information.

Twin Otter (N48RF)

Aircraft Commander: N/A
Current Mission: Maintenance (through March 2016)

The aircraft is undergoing scheduled maintenance for inspections and equipment upgrades that will increase capability to support NOAA science and extend the life of the aircraft.

Twin Otter (N56RF)

Aircraft Commander: LT Marino
Temporary base: Saint Simons Island, GA
Current Mission: North Atlantic Right Whale surveys

North Atlantic right whales are critically endangered and listed under the Marine Mammal Protection Act. Aerial surveys serve multiple objectives with regard to conservation including providing locations and distribution of right whales to mariners to avoid collisions with ships, photo identification records on right whales, information on distribution and abundance of marine mammals and turtles, and provide sightings of dead whales for monitoring mortality.

Twin Otter (N57RF)

Aircraft Commander: LTJG Coker
Temporary base: Florida Keys and Various Locations
Current Mission: Florida Keys National Marine Sanctuary Usage Surveys and TopoBathy LiDAR

The Florida Keys National Marine Sanctuary (FKNMS) encompasses approximately 3,800 square miles. These surveys will help sanctuary managers better utilize resources and understand usage patterns within the FKNMS and surrounding waters and are funded by the NOAA Coral Reef Conservation Program. The TopoBathy LiDAR mission will collect data in the coastal zone used to produce the most up-to-date- and accurate marine navigation charts, FEMA flood plain and inundation maps, and other Integrated Ocean and Coastal Mapping (IOCM) applications. Data gathered will help ensure safe and efficient marine transportation and benefit coastal communities with accurate resource management and aid emergency response efforts.

King Air (N68RF)

Aircraft Commander: LCDR Waddington/LT Sims
Current Mission: Various Locations – Continuous Coastal Mapping

Coastal Mapping is an on-going mission of NOAA's National Geodetic Survey (NGS) to survey approximately 95,000 miles of United States coastline providing the Nation with an accurate, up-to-date and seamless database of the national shoreline. This data is used as the baseline for defining America's marine territorial limits, including its Exclusive Economic Zone, and for the geographic reference needed to manage coastal resources and support marine navigation. Stereo photogrammetry and Light Detection and Ranging (LiDAR) are used to produce a digital database. In addition, the Coastal Mapping Program supports NOAA's homeland security and emergency response requirements by rapidly acquiring and disseminating a variety of datasets to federal, state, and local government agencies as well as the general public

OMAO'S AIRCRAFT OPERATIONS CENTER (AOC)

CAPT Harris Halverson, Commanding Officer AOC

The AOC, located at MacDill Air Force Base in Tampa, Florida, serves as the main base for OMAO's fleet of nine aircraft and provides capable, mission-ready aircraft and professional crews to the scientific community. Whether studying global climate change or acid rain, assessing marine mammal populations, surveying coastal erosion, investigating oil spills, flight checking aeronautical charts, or improving hurricane prediction models, the AOC flight crews continue to operate in some of the world's most demanding flight regimes.



NOAA's Gulfstream-IV and its crew set out from Honolulu on their third mission of the 2016 El Nino Rapid Response Field Campaign on January 26 around Kribati Island. They achieved their goal of sampling the vertical profile of the atmosphere using dropwindsondes near the equator in hopes of better understanding poleward moving air from storm activity near the Intertropical Convergence Zone (ITCZ). This information helps researchers better understand the impacts of El Nino effects on weather.



Unmanned Systems Support



NASA Global Hawk

Location: Edwards Air Force Base (AFB), CA/ NASA Wallops Flight facility

Mission: El Niño Southern Oscillation (ENSO) project

NASA's Global Hawk Unmanned Aircraft System (UAS) is being configured for the NOAA funded El Niño Southern Oscillation (ENSO) series of flights in February and March 2016. The ENSO flights will be conducted in the Eastern Pacific Ocean and fall under NOAA's multi-year Sensing Hazards with Operational Unmanned Technology (SHOUT) project, which is an ongoing demonstration of utilizing the Global Hawk aircraft for NOAA's weather observations and research throughout the Pacific, Atlantic, and Gulf of Mexico. LCDR Neuhaus is supporting as a Project Manager.

APH-22 Hexacopter

Location: Everett, Washington

Mission: Levee Setback Environmental Condition Monitoring

The NOAA Northwest Restoration Center (NWRC) seeks to add another layer of information to the monitoring effort on levees in the Snohomish River estuary in Puget Sound by utilizing data collected by the APH-22 UAS. More broadly, the NWRC is also interested in what other value UAS data can add to restoration efforts, and how this might lead to further collaboration opportunities with its partners. The broad goals of the project are to transform the site into a vegetated, self-sustaining wetland that will 1) maximize the modern, natural ecological potential of the site 2) minimize adverse effects on, and add socio-economic value to the surrounding community and 3) advance the science and practice of restoration. Monitoring is critical in realizing and evaluating the performance of the project.

Location: Cape Shirreff, Livingston Island, Antarctica

Mission: Antarctica Marine Mammal Project

NOAA's Southwest Fisheries Science Center is deploying the APH-22 UAS platform for penguin and fur seal surveys on Cape Shirreff. This season's efforts will focus on utilizing the UAS for collection of replicate counts of breeding pairs and chicks for Gentoo and chinstrap penguins, Antarctic fur seal pup counts and defining the relationship between mass of leopard seals and their size and shape as determined from vertical aerial photographs. This later goal is especially important because the other alternative is to drug and capture the animals, which can be dangerous for both the scientist and the animals studied. In addition to these goals, studies on wildlife response to UAVs will be conducted with Antarctic fur seals, elephant seals, chinstrap, and Gentoo penguins.

Puma UAS

Location: USCGC Polar Star (WAGB10)

Mission: Operation Deep Freeze 2016

The USCG and the NOAA UAS Program Office will evaluate the AeroVironment Puma AE during Operation Deep Freeze 2016 on the US Coast Guard Cutter Polar Star. The USCGC (Icebreaker) Polar Star is tasked with opening and maintaining an open channel for supply and fuel ships that allow research to be conducted at the National Science Foundation's McMurdo Station, Antarctica. The PUMA will be hand/catapult launched from the USCGC POLAR STAR, and recovered using the net capture system. The PUMA AE UAS operational objectives will:

- Assess USCGC Polar Star's shipboard UAS capabilities.
- Conduct Puma AE operations safely from the USCGC Polar Star while underway in the Antarctic in USAP controlled airspace including beyond visual line-of-site operations.
- Conduct shipboard recoveries utilizing autonomous square net capture procedures on the USCGC Polar Star flight deck and develop/refine tactics, techniques, and procedures.
- Conduct Surveillance and Reconnaissance operations.
- The Puma AE will be available to support Search and Rescue (SAR) (emergency response) scenarios.



OMAO Partnerships



United States Senate Committee on Commerce, Science, and Transportation

Location: Washington, DC

Detail: LCDR Wendy Lewis, NOAA Commissioned Officer Corps

LCDR Lewis is currently on detail to the Committee with the staff of the Chair, Senator John Thune (R-SD), where she is assisting on activities pertaining to oceans, atmosphere, and fisheries policy, as well as other matters within the Committee's jurisdiction.

National Science Foundation

Location: Antarctica

Mission: LT Jesse Milton, NOAA Commissioned Officer Corps

Members of the [NOAA Commissioned Officer Corps](#) carry out NOAA's mission in remote locations across the globe. LT Milton is assigned to Antarctica where he serves as the Station Chief for NOAA's Atmospheric Research Observatory (ARO) at the Amundsen-Scott South Pole Station. The ARO at the Amundsen-Scott South Pole Station is a National Science Foundation facility used in support of scientific research related to atmospheric phenomena.

Department of Defense - U.S. Pacific Command (USPACOM)

Location: Honolulu, Hawaii

Embedded Liaison: CAPT Barry Choy, NOAA Commissioned Officer Corps

The U.S. Pacific Command (USPACOM) area of responsibility encompasses approximately half the earth's surface and more than half of its population. The 36 nations that comprise the Asia-Pacific include: two of the three largest economies and nine of the ten smallest; the most populous nation; the largest democracy; the largest Muslim-majority nation; and the smallest republic in the world. The region is a vital driver of the global economy and includes the world's busiest international sea lanes and nine of the ten largest ports. By any meaningful measure, the Asia-Pacific is also the most militarized region in the world, with seven of the world's ten largest standing militaries and five of the world's declared nuclear nations. Under these circumstances, the strategic complexity facing the region is unique. CAPT Choy is linked closely with the activities within the region allowing for identification of opportunities and cooperation between USPACOM and NOAA, and better overall government function situational awareness in the region.

Department of Defense - U.S. Northern Command (USNORTHCOM)

Location: Boulder, Colorado

Embedded Liaison: CAPT Mark Moran, NOAA Commissioned Officer Corps

U.S. Northern Command (USNORTHCOM) partners to conduct homeland defense, civil support, and security cooperation to defend and secure the United States and its interests. NORTHCOM's area of responsibility includes air, land, and sea approaches and encompasses the continental United States, Alaska, Canada, Mexico, and the surrounding water out to approximately 500 nautical miles. It also includes the Gulf of Mexico, the Straits of Florida, and portions of the Caribbean region that include The Bahamas, Puerto Rico, and the U.S. Virgin Islands. CAPT Moran serves as the liaison for the NOAA Corps, helping to plan, organize, and execute homeland defense and civil support missions.

Department of Defense - U.S. Navy

Location: Washington, DC

Embedded Liaison: CDR Christiaan van Westendorp, NOAA Commissioned Officer Corps

CDR van Westendorp serves as NOAA liaison to the Oceanographer of the Navy and is an important interface between the U.S. Navy and other U.S. Federal Agencies, including NOAA. As NOAA Liaison, CDR van Westendorp serves as the Head of the Interagency Policy Branch of the International and Interagency Policy Division, Office of the Oceanographer of the Navy, located at the U.S. Naval Observatory. The mission of this Division is to coordinate and execute the

Oceanographer of the Navy functions related to policy and programs involving international and/or interagency oceanography. Oceanography includes meteorology, oceanography, mapping, charting and geodesy, astronomy, and precise time and time interval.

Location: Stennis Space Center, Mississippi

Embedded Liaison: LCDR Jonathan French, NOAA Commissioned Officer Corps

Embedded in the Navy's Naval Oceanography Mine Warfare Center, LCDR French works side by side with Navy officers operating Unmanned Underwater Vehicles worldwide and is currently deployed to the Arabian Gulf. This collaboration will provide knowledge and experience that will keep NOAA on the cutting edge of this emerging technology as well as strengthen the partnership between NOAA and the Navy.

Department of Homeland Security - U.S. Coast Guard

Location: Washington, DC

Embedded Liaison: CAPT Scott Sirois, NOAA Commissioned Officer Corps

As the NOAA liaison to the United States Coast Guard (USCG), CAPT Sirois maintains a current and comprehensive knowledge of interagency activities and policies related to the USCG and NOAA. He identifies potential conflicts or benefits issues for analysis and evaluation, conducts appropriate assessments and studies, and serves as the interface between NOAA and the USCG. CAPT Sirois initiates, designs, and implements strategies through federal agency liaison and coordination that results in cooperative arrangements for maritime security, oceanographic research, hazardous materials spill response, and many other activities.

Consortium for Ocean Leadership

Location: Washington, DC

Embedded Liaison: LCDR Josh Slater, NOAA Commissioned Officer Corps

LCDR Josh Slater serves as the NOAA liaison to the Consortium for Ocean Leadership (COL) and maintains a current and comprehensive knowledge of activities and policies related to COL's work and NOAA. The Consortium for Ocean Leadership represents more than 100 of the leading public and private ocean research and education institutions, aquaria and industry with the mission to advance research, education and sound ocean policy.



Teacher At Sea Program



The mission of the [Teacher at Sea](#) (TAS) program is to give teachers a clearer insight into our ocean planet, a greater understanding of maritime work and studies, and to increase their level of environmental literacy by fostering an interdisciplinary research experience. The program provides a unique environment for learning and teaching by sending kindergarten through college-level teachers to sea aboard NOAA research and survey ships to work under the tutelage of scientists and crew. Then, armed with new understanding and experience, teachers bring this knowledge back to their classrooms. Since its inception in 1990, the program has enabled more than 600 teachers to gain first-hand experience of science and life at sea. By participating in this program, teachers enrich their classroom curricula with knowledge that can only be gained by living and working side-by-side, day and night, with those who contribute to the world's body of oceanic and atmospheric scientific knowledge. Below is a list of the NOAA Teachers at Sea for the current monthly update for the 2015 Field Season. Once they have embarked on their cruise, you can gain access to their blogs which document their missions at sea and offer a wealth of information about the research being conducted as well as personal stories.

2015 Season Stats: 21 teachers sailed on different projects on NOAA vessels

[2015 TAS Placements Blogs](#)



Teacher-At-Sea, DJ Kast prepares to launch a drifter buoy as part of NOAA's Adopt-a-Drifter Program.

[Photo: NOAA]



OMAO - NOAA Dive Program



OMAO manages and implements [NOAA's Dive Program](#) (NDP), which trains and certifies scientists, engineers, and technicians from federal, state, tribal governments, and the private sector to perform the variety of tasks carried out underwater to support NOAA's mission. NDP also has cooperative diving agreements with over 100 government agencies and academic institutions. NOAA has more than 400 divers who perform over 14,000 dives per year. The NDP is headquartered at the NOAA Diving Center at the NOAA Western Regional Center in Seattle, Washington.



NOAA Divers explore the wreck of the German submarine, U-701, which sank on July 7, 1942, off Cape Hatteras, North Carolina.
[Photo: NOAA]



OMAO Small Boat Program



OMAO manages NOAA's [Small Boat Program](#) and sets policy and provides safety inspections for almost 400 small boats operated by the various Line and program offices throughout NOAA, which support fisheries laboratories, dive support, nautical charting, ocean and Great Lakes research, and more.



NOAA small boats support many diverse operations across the country.

[Photos: NOAA]

Office of Marine and Aviation Operations



Providing environmental intelligence for a dynamic world



The personnel, ships, and aircraft of NOAA play a critical role in gathering environmental data vital to the nation's economic security, the safety of its citizens, and the understanding, protection, and management of our natural resources. The NOAA fleet of ships and aircraft is managed and operated by the Office of Marine and Aviation Operations (OMAO), an office comprising civilians, mariners, and officers of the NOAA Commissioned Officer Corps, one of the seven uniformed services of the United States. NOAA's roots trace back to 1807, when President Thomas Jefferson ordered the first comprehensive coastal surveys. Those early surveys ensured safe passage of ship-borne cargo for a young nation. As the needs of the nation have grown, so too have OMAO's responsibilities. Today, OMAO civilians and NOAA Corps officers operate, manage, and maintain NOAA's active fleet of 16 research and survey ships and nine specialized aircraft. Together, OMAO and the NOAA Corps support nearly all of NOAA's missions.



NOAA has the largest fleet of federal research and survey ships in the nation. The fleet ranges from large oceanographic ships capable of exploring and charting the world's deepest ocean, to smaller vessels responsible for surveying the shallow bays and inlets of the United States. The fleet supports a wide range of marine activities including fisheries surveys, nautical charting, and ocean and climate studies. Based throughout the continental United States, Alaska, and Hawaii, the ships operate in all regions of the nation and around the world.

NOAA's aircraft provide a wide range of airborne capabilities. Our highly specialized Lockheed WP-3D "Hurricane Hunter" aircraft are equipped with an unprecedented variety of scientific instrumentation, radars, and recording systems for both in situ and remote sensing measurements of the atmosphere, the Earth, and its environment. Equipped with both C-band weather radar and X-band tail Doppler radar systems, the WP-3Ds have the unique ability to conduct tropical cyclone research in addition to storm reconnaissance. Together with NOAA's Gulfstream IV-SP hurricane surveillance jet, these aircraft greatly improve our physical understanding of hurricanes and enhance the accuracy of tropical cyclone forecasts. NOAA's light aircraft also play a vital role in monitoring our environment. Our King Air, Commander and Twin Otter aircraft support marine mammal population studies, shoreline change assessments, oil spill investigations, and water resource/snowpack surveys for spring flood forecasts.



The NOAA fleet provides immediate response capabilities for unpredictable events. For example, in November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA's National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.

After Hurricane Sandy in 2012, NOAA ships Thomas Jefferson and Ferdinand R. Hassler conducted emergency bathymetric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure. In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA's entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.

While manned aircraft and sea-going vessels have been, and will continue to be, a primary source of environmental data, new technology will have a significant role to play in the future NOAA fleet. OMAO, in coordination with other NOAA offices and federal agencies, is evaluating and deploying remotely piloted underwater and aircraft systems that could significantly contribute to environmental observations. OMAO's ongoing challenge is to meet the growing demand for in situ scientific data while providing the highest level of service. To better serve the needs of the nation, NOAA is examining the composition of the fleet through an exhaustive and critical review of at-sea science and observation requirements. Our objective is to develop a clear, cost-efficient path forward to ensure that the NOAA fleet can continue to conduct at-sea surveys and research vital to fisheries management, updating nautical charts, responding to natural and manmade disasters, and understanding coastal and marine systems more fully. Meeting these requirements is essential to developing sustainable, science-based management and conservation plans that protect the health and resiliency of these resources over the long-term.

We continue our efforts to build a civilian and NOAA Corps officer work force that is uniquely qualified to gather critical environmental intelligence and be adaptive and responsive to a changing world and work to expand our partnerships with other federal agencies. For example, NOAA Corps officers are currently assigned to work in the Department of Defense, National Science Foundation, and the U.S. Senate among others where they lend their expertise and service. We also continue to strengthen our partnership with the U.S. Coast Guard. Our basic NOAA Corps officer training class is held at the U.S. Coast Guard Academy, where newly commissioned officers train alongside Coast Guard officer candidates, developing skills and professional relationships that will benefit both services, especially during challenging times. Active collaboration among the Federal family is critical to ensuring the long-term capability and success of the federal ocean infrastructure. Our partners' success is our success. The men and women of OMAO and the NOAA Corps provide environmental intelligence for a dynamic world as they serve our nation every day from the farthest seas to the highest skies.

NOAA Commissioned Officer Corps

– Honor, Respect, Commitment –



The [NOAA Commissioned Officer Corps](#) (NOAA Corps) is one of the nation's seven uniformed services and serve with the 'special trust and confidence' of the President. NOAA Corps officers are an integral part of the National Oceanic and Atmospheric Administration (NOAA), an agency of the U.S. Department of Commerce. With 321 officers, the NOAA Corps serves throughout the agency's line and staff offices to support nearly all of NOAA's programs and missions. The combination of commissioned service and scientific expertise makes these officers uniquely capable of leading some of NOAA's most important initiatives.

The NOAA Corps is part of NOAA's Office of Marine and Aviation Operations (OMAO) and traces its roots back to the former U.S. Coast and Geodetic Survey, which dates back to 1807 and President Thomas Jefferson. In 1970, NOAA was created to develop a coordinated approach to oceanographic and atmospheric research and subsequent legislation converted the commissioned officer corps to the NOAA Corps. The NOAA Corps today provides a cadre of professionals trained in engineering, earth sciences, oceanography, meteorology, fisheries science, and other related disciplines. Corps officers operate NOAA's ships, fly aircraft, manage research projects, conduct diving operations, and serve in staff positions throughout NOAA.

Benefits of the NOAA Corps to the Nation

The combination of commissioned service with scientific and operational expertise, allows the NOAA Corps to provide a unique and indispensable service to the nation. NOAA Corps officers enable NOAA to fulfill mission requirements, meet changing environmental concerns, take advantage of emerging technologies, and serve as environmental first responders. For example:

- In November 2014, our aircraft flew missions over upstate New York after the record snow falls of up to seven feet and conducted airborne Snow Water Equivalent (SWE) and soil moisture measurements. Airborne SWE measurements are used by NOAA's National Weather Service when issuing river and flood forecasts, water supply forecasts, and spring flood outlooks.
- After Hurricane Sandy in 2012, NOAA ships *Thomas Jefferson* and *Ferdinand R. Hassler* conducted emergency bathymetric surveys to locate possible submerged navigational hazards in the ports of New York and Virginia. These surveys enabled the ports to reopen quickly. Aerial images of storm-stricken regions, taken by NOAA aircraft, helped residents and emergency workers to quickly assess the condition of houses, bridges, and vital infrastructure.
- After Hurricane Irene in 2011, the NOAA Ship *Ferdinand Hassler* and team completed 300 lineal nautical miles of survey work in less than 48 hours providing a Damage Assessment that enabled the U.S. Coast Guard to re-open ports and restore more than \$5M per hour in maritime commerce less than three days after the storm.
- In 2010, the NOAA fleet and the NOAA Corps played a major role in the response to the BP Deepwater Horizon oil spill. NOAA's entire Atlantic fleet and over a quarter of the total strength of the NOAA Corps were deployed to the Gulf following the spill, developing mission plans and assisting response efforts.